

**Notice of Allowability**

Application No.

10/078,719

Applicant(s)

YEO ET AL.

Examiner

Alonzo Chambliss

Art Unit

2827

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to interview summary filed on 3/12/03.
2. ☒ The allowed claim(s) is/are 1-7,9-14 and 16-32.
3. ☒ The drawings filed on 19 February 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).  
\* Certified copies not received: \_\_\_\_\_.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
(a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No. \_\_\_\_\_.  
(b) ☐ including changes required by the proposed drawing correction filed \_\_\_\_\_, which has been approved by the Examiner.  
(c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the top margin (not the back) of each sheet. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- 1 ☒ Notice of References Cited (PTO-892)  
3 ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
5 ☐ Information Disclosure Statements (PTO-1449), Paper No. \_\_\_\_\_.  
7 ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- 2 ☐ Notice of Informal Patent Application (PTO-152)  
4 ☒ Interview Summary (PTO-413), Paper No. 2.  
6 ☒ Examiner's Amendment/Comment  
8 ☒ Examiner's Statement of Reasons for Allowance  
9 ☐ Other

## DETAILED ACTION

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Michael D. Murphy on March 12, 2003.

2. The application has been amended as follow:

#### IN CLAIMS:

Cancel claims 8, 15, and 33-39.

In claim 1, line 11, delete " and " --;

In claim 1, line 17, after " bottom-side pads; " insert -- a ground plane disposed on said bottom-side of said substrate within a central area of said bottom side of said substrate, said bottom side pads disposed generally about said ground plane; a plurality of thermal solder balls coupled to said ground plane to electrically and thermally couple said ground plane with the primary circuit board; a plurality of thermal vias projecting upward from said ground plane through said substrate to said top side of said substrate such that said plurality of thermal vias are beneath the flip chip die when the flip chip die is mounted to said top side; and conductive traces coupling selected ones of said conductive paths that are connected to electrical ground to said thermal vias --;

In claim 14, line 20, after " circuit board " insert -- ; and conductive traces coupling selected ones of said conductive paths to respective ones of said thermal vias to establish electrically conductive paths from the flip chip die to said ground plane --;

In claim 25, line 22, after " ground plane, " insert -- , selected ones of said conductive traces extending to connect said second plurality of vias to electrical ground; and --.

***Allowable Subject Matter***


3. The following is a statement of reasons for the indication of allowance subject matter: the prior art of record does not teach or suggest the combination ground and signal pads on the top side of a substrate to connect with corresponding connections on a die. Another set of ground and signal pads on the bottom surface of the substrate. A central ground plane disposed on the bottom side and positioned opposite of top side. A first plurality of via for electrically connecting the top pads to the bottom pads, wherein the pads on the top and bottom sides of the substrate are coupled to the vias by conductive traces on the top and bottom sides. A second plurality of vias (i.e. ground thermal vias) within the mounting area of the top surface of the substrate, wherein the vias extend from the top side into the central ground plane on the bottom side to provided thermal conduction paths between the die and ground plane. Selected ones of the conductive traces extending to connect to the thermal vias.

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Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for the Group is (703) 308-772 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-7956.

  
DAVID L. TALBOT  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

AC  
AC/March 12, 2003